4a/fl

FLETCHER

highway safety

STANDARDIZED GRANITE HIGHWAY PRODUCTS

traffic control

granite

1957 24

advantages

STANDARDIZED CHELMSFORD WHITE GRANITE CURB

SAFETY
Granite curb clearly defines the edge of the highway pavement. Edge definition provides a high degree of protection to both motorist and pedestrian.

PREVENTS EROSION
By confining surface waters within the pavement channel, edge ravelling is prevented, gutters are not undercut, and shoulders and fill are protected from erosion.

NO DISINTEGRATION
Granite does not readily disintegrate under a destructive freeze-thaw weather cycle, nor by deleterious action of salts or other chemicals used for removal of ice and snow.

LONG LIFE
Granite is practically indestructible as a curb material. Dense and tough, it resists wear, shock, and abuse of vehicular traffic. Its life is measured by the century.

APPEARANCE
Modern machinery and methods can produce granite curb with smooth top surfaces if a machine finish is desired. New tools facilitate splitting too. Aesthetically, split granite is still the preference of many designers.

SALVAGE
Because of its long life and practically indestructible nature, granite curb can be reset to a new line and grade on the same location or at a new site.

ECONOMY
Use of granite curb from the viewpoint of the taxpayer, is a clearcut economy. Non-use of granite curb in highway construction and bridges can be a luxury.

VISIBILITY
Whether Chelmsford White Granite is retained in its natural whiteness or receives a special luminous treatment, bright curb reflectance makes for high visibility.

ACCIDENT PREVENTION
Statistical studies show that the use of curbing in conjunction with sidewalks has reduced pedestrian accidents approximately fifty percent at such locations.

PROMPT DELIVERY
Standardization of curb types permits formation of stock inventories of curb described in this catalog. Selection from standardized types listed assures prompt delivery from curb stocks at our West Chelmsford plant.

VERTICAL CURB defines exactly the boundaries of a highway pavement strip. The channel through which the traffic stream must flow is precisely determined for use under all conditions of weather and all hours of the day. Effect of this use of curb in terms of human safety and economics of highway operation and maintenance, is no longer in dispute. The question is not whether there shall be curb but, "what kind of curb?" Besides practical values that can be measured in physical terms, the clean white edging of granite curb brings to the winding pavement, trimness and a feeling of definite order that integrates landscape and highway. White granite curb, besides being a sentinel of safety, plays a role of considerable aesthetic and social importance in the great scheme of highway planning. We hope the curb described and specified in this catalogue will offer constructive suggestion in the choice of appropriate type and use of granite curb.

VA

VERTICAL GRANITE CURB, type A

Type	Width at Top, inches	Nominal Depth, inches	Minimum Length, ft.	Approx. Wt. lbs./Lin. ft.	Finish
VA-1	7	18 ± 1	6	160	Sawn top, Split face, Jointed
VA-2	7	20 ± 1	6	180	
VA-3	6	20 ± 1	6	175	
VA-4	6	18 ± 1	6	145	

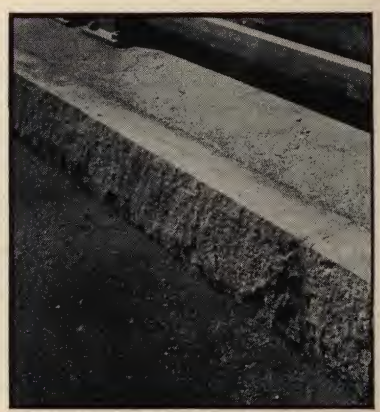
Used primarily where traffic speeds are restricted, such as City Streets, Congested Areas, Traffic or Safety Islands, ramps on grade eliminations, and cloverleafs. Types VA-2 or VA-3 (and VB-0, VB-2, below) are recommended where additional depth of gutter is necessary.
See specifications Part a, page 10.

VA for bridges

VERTICAL GRANITE CURB, type A

Type	Width at Top, inches	Nominal Depth, inches	Minimum Length, ft.	Approx. Wt. lbs./Lin. ft.	Finish
VA-5	6	12 ± ¼	4	90	Sawn top, Split face, Closely bedded, Jointed

Other sections of this curb to meet special construction conditions will be cut to order on request. Used wherever curb depths are limited, such as, Tunnels and Approaches, Bridges, Underpasses, Elevated Structures. See specifications Part b, page 13 and curb detail below on this page.
See page 6 for SD, Slope Bridge Curb.



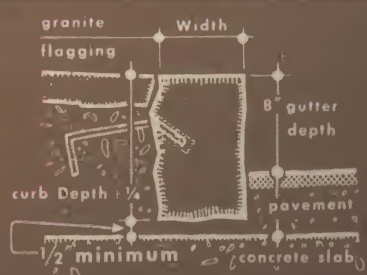
VB

VERTICAL GRANITE CURB, type B

Type	Width at Top, inches	Nominal Depth, inches	Minimum Length, ft.	Approx. Wt. lbs./Lin. ft.	Finish
VB-0	5	18 ± 1	3	125	
VB-1	5	16 ± 1	3	105	Sawn top, Split face, Jointed
VB-2	4	18 ± 1	3	115	
VB-3	4	16 ± 1	3	100	
VB-4	3	17 ± 2	3	100	

Used in similar locations and applications as regular VA series. Reduced weight of VB series effects savings in transportation and setting. Types VB-0 and VB-2 are for installations where additional depth of gutter is necessary. See specifications Part a, page 10.

Types VA and VB have smooth sawn tops, clean split faces.
Type VA-5 is designed for bridges, elevated structures, underpasses, and tunnels where the character of construction limits depth of curb. These locations present critical problems due to expansion and contraction, vibration, freezing and thawing, and use of anti-freeze chemicals.
Economy and quick deliveries urge the use of Standardized VA, VB, or VC Circular Curb. The H. E. Fletcher Company carries in stock 90° sets of 10, 12, 15 and 20 feet radii. Circular runs in above radii, and 25 to 50 feet by increments of 5 feet, are in stock and will be jointed to order.
When available, straight curb in lengths less than 6 feet will be furnished at no additional cost for use on VA circles with radii between 160 feet and 400 feet.



VERTICAL GRANITE CURB
VA-5 for bridges

VC VD

VERTICAL GRANITE CURB, types **C** and **D**

Type	Width at Top, inches	Nominal Depth, inches	Minimum Length, ft.	Approx. Wt. lbs./Lin. ft.	Finish
VC	5 ± ½	16 ± 2	3	95	Scabbled top Split face Jointed
VD	4 ± 1	16 ± 2	1	80	

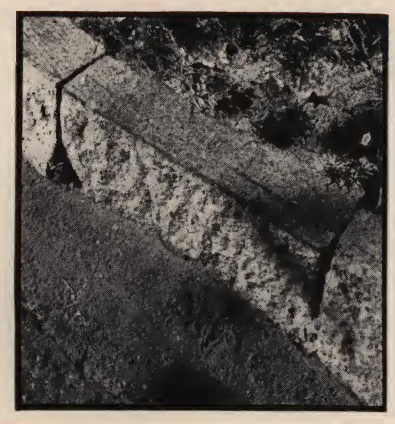
Used where smooth top is not required. For Highways, Residential Streets, Parking Areas, Driveways and similar locations where traffic should be restricted to pavement areas. These types of curbing are principally used where the natural, more rustic appearance blends with the general landscaping.
See specifications Part a, page 10 and curb detail below on this page.

VE

VERTICAL GRANITE CURB, type **E**

Type	Width at Top, inches	Nominal Depth, inches	Minimum Length, in.	Approx. Wt. lbs./Lin. ft.	Finish
VE-1	5½ ± 1½	17 ± 2	12	145	Sawn top Split face Jointed
VE-2	3½ ± 1½	17 ± 2	12	100	

An economical, sawed top curb, produced in short lengths with pitched front arris and smooth split face. This curb may be set with or without mortar joints.
See specifications Part a, page 10.



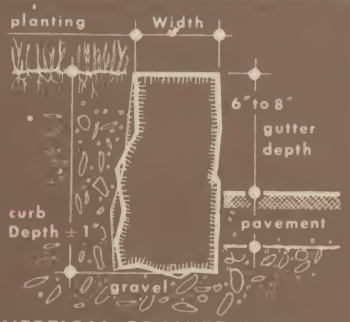
VRE

VERTICAL GRANITE CURB, type **RE**

Type	Width at Top, inches	Nominal Depth, inches	Minimum Length, in.	Approx. Wt. lbs./Lin. ft.	Finish
VRE-1	6 ± 1	19 ± 2	16 to 30	130	Rough Quarry Split
VRE-2	4 ± 1	16 ± 2	12 to 24	80	
VRE-3	3 ± 1	13 ± 1	9 to 18	50	

Most economical of all vertical curbs. Used generally in same locations as Types VC and VD Curb. It is recommended for Residential Streets, Housing Developments, Parking Areas, and similar locations where a low cost curb is required. This edging is generally set, without mortar, in the same manner as Types VC or VD. See specifications Part a, page 10.

In spite of extensive mechanization of granite quarrying and fabrication, it is a curious and interesting point that splitting, the most ancient method of granite division, is still the most economical method. Consequently, it is suggested that to attain lowest masonry costs, split granite surfaces be used. However, because split surfaces are not always appropriate finishes, various surface dressing techniques have long been employed. Use of power tools and new metallurgical achievements make possible a range of finishes not known before our time. The reason splitting is not more extensively used is that few granites split with clean, even surfaces. Some stones split to almost machine-like perfection, in others the cleavage exposes a brutal distorted ugly surface. Chelmsford granites are characterized, in splitting, by exceptionally clean surfaces which, within the common range of building stone sizes, deviate but slightly from a plane surface.



VERTICAL GRANITE CURB

V series table, Part a, page 10

STANDARDIZED VERTICAL CURB INLETS

Type	Width at Top, inches	Nominal Depth, inches	Length, ft.	Approx. Wt. lbs.	Finish
VA-1	7	18 ± 1	6 ft. ± 1	1000	Sawn top Split face Jointed
VA-4	6	18 ± 1	6 ft. ± 1	1000	
VB-0	5	18 ± 1	6 ft. ± 1	1000	
VB-2	4	18 ± 1	6 ft. ± 1	1000	

Standardized curb inlets vary only in width of top to correspond with width of matching regular curbstones. Circular face inlets fabricated to exact radius are cut to order. Inlet curb sections, and corner blocks shown below, are necessary accessories to all vertical curb. The H. E. Fletcher Company is equipped to furnish both of these accessories in widths to match adjoining curb. Inlet sections with gutter mouths, are used at catch basin locations in order to provide overflow relief when gratings are obstructed.
See specifications Part c, page 14.

STANDARDIZED VERTICAL CURB CORNERS

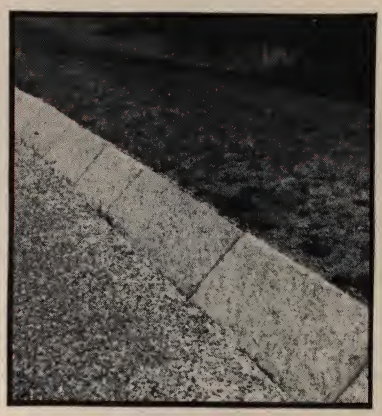
Style †	Radius, feet	Width matching joint, inches	Approx. Wt. lbs.	Finish
A	2	4, 5, 6, 7	550	Dressed top Split or sawn face Jointed
B	3	4, 5, 6, 7	1050	

† *For depth of curb corners see table, paragraph d.3.1.*

Standardized curb corner blocks are most commonly used for driveway and alley entrances. They are fabricated as full 90° turns, in two available radii; Style A, 2′-0″, and Style B, 3′-0″. Stock production provides for corners with joints of 4, 5, 6, or 7 inches to correspond with width of matching regular curbstones. Curb corner blocks should be ordered: "Style.....(*insert A or B*) to fit type.....curbstone (*insert type of curbstone, i.e. VA etc.*)" See specifications Part d, page 15.

SLOPE GRANITE CURB, types A, B, B-2 and C

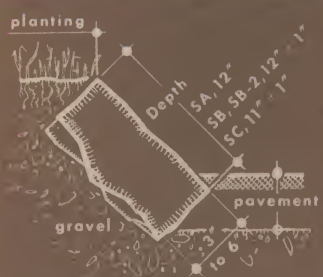
Type	Depth at face	Nominal Thickness, inches	Minimum Lengths, ft.	Approx. Wt. lbs./Lin. ft.	Finish
SA	12	4½ ± 1½	3	65	Split face Jointed
SB, SB-2	12 ± 1	4½ ± 1½	2	65	
SC	11 ± 1	4½ ± 1½	1	60	



Slope granite curb provides pavement definition like vertical curb but also permits off-road parking and opportunity for vehicles to veer from pavement. Because motorists drive closer to sloped curb than to vertical curb, effective width of pavement is increased by at least two feet. ¶Types SA, SB, and SC are designed to receive a grass strip against top front arris. Type SB-2, (pitched top arris), has been added to the slope curb series for use where concrete or bituminous material abuts top arris.
See specifications Part e page 16, and curb detail below.
See page 6 for SD, Slope Bridge Curb.

Earnest use of slope curb for highway use in the United States probably dates from the middle 1930's. Any doubts of its ability to "stand up" based on theoretic considerations soon disappeared. Early trials, circumspect and wary soon gave way to deliberate choice of slope curb in special applications. Slope curb meets unperturbed the vicious attack of the toughest equipment used in highways, including snow removal machines and other heavy equipment. Every year more and more of this design is specified. Slope curb in short lengths is readily adapted to curving highway alignment, unlike curved vertical curb which must always be cut to template and radius.

Perhaps because a slope surface seems to be a less formal treatment than vertical curb, wide joints, 1½ to 2 inches, are attractive visual elements of design and do not betray a demand to cut cost corners.



SLOPE GRANITE CURB
SA, SB, SB-2, SC, types

SD for bridges

SLOPE GRANITE CURB, type **D**

Type	Depth at face	Nominal width	Minimum lengths	Approx. Wt. lbs./Lin. ft.	Finish
SD	12″	3″ to 6″	3 ft.	65	Split face Jointed Closely bedded

A slope curb similar in general aspect to the other S series curbs, but modified for the more exacting requirements of bridge curb. A tighter specification (than regular S series, page 5), includes accurate top and bottom arrises, and a splayed surface, bottom back, to facilitate setting curb to constant slope. Recommended slope 1:1. Note comments for regular S type curb, page 5.
See specifications Part f, page 18; see also curb details below.

RUBBLE PAVEMENT BLOCKS

Type	Length	Width	Depth	Remarks
RPS	4″ to 12″	3″ to 5″	3″ to 5″	Fairly rectangular with one good face

A recent design development in highway median strips employs Granite Rubble Blocks laid lengthwise with the highway. Rubble Blocks, projecting perhaps an inch above the pavement surface, warn driver by rumble and vibration that the vehicle is off the main pavement.

Blocks should be laid with about 1″ joints, approximately 30 blocks to a square yard. A thousand blocks weigh about 8 tons.

BOUND POSTS

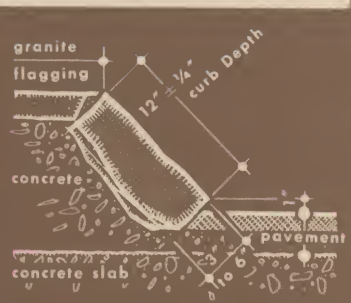
type	cross section	length	top finish	bottom finish
land court	3″to 4″ x 3″to 4″	3′-6″ ± 2″	dressed	split
split	5″to 6″ x 5″to 6″	2′-3″ ± 3″	split	split
surveyor's	6″ x 6″	3′-9″ ± 3″	dressed	split
standard	6″ x 6″ pitched	3′-1″ ± 1″	dressed	dressed
town	7″ x 7″	4′-0″ ± 3″	dressed & 1″ down †	split
highway‡	6″ x 6″	5′-0″ ± 3″	dressed & 12″ down †	split

† Split finish on vertical sides except where noted "dressed ± 1″ (12″) down". (i. e. down from top)
‡ If required, three 1 ¾″ letters will be inscribed on one side.

Holes ½″ diameter, in top will be furnished when ordered. Sizes shown in table carried in stock.

Slope curb, visually a less abrupt physical form than vertical curb, functions as a transition element rather than a division or separation element. Its engineering appellation, mountable curb, accurately suggests the common technical reason for the use of slope curb in highway design and traffic control planning. Consequently slope curb is rarely used with sidewalks unless a generous planting strip is provided as a separation between the two. Slope curb has its own place in highway design—it is not a substitute for vertical curb.

The use of Rubble Pavement Blocks, (noted above) to warn a driver by his response to auricular and tactile effect is an interesting and novel mode of containing vehicles within the pavement strip without the use of a barrier such as vertical or slope curb.



SLOPE GRANITE CURB
☛ SD type, for bridges

Recapitulation of curb types

Type	Width at Top, inches	Nominal Depth, inches	Minimum‡ Length, ft.	Approx. Wt. lbs./Lin. ft.	Minimum width at Bottom, inches	Finish on top surface: sawn	split	scabbled
VA-1	7	18 ± 1	6	160	5, for ⅔ length	●		
VA-2	7	20 ± 1	6	180	5, "	●		
VA-3	6	20 ± 1	6	175	5, "	●		
VA-4	6	18 ± 1	6	145	5, "	●		
VA-5	6	12 ± ¼	4	90	5, "	●		
VB-O	5	18 ± 1	3	125	4, "	●		
VB-1	5	16 ± 1	3	105	4, "	●		
VB-2	4	18 ± 1	3	115	4, "	●		
VB-3	4	16 ± 1	3	100	4, "	●		
VB-4	3	17 ± 2	3	100	3, for ½ length	●		
VC	5 ± ½	16 ± 2	3	95	3, "			●
VD	4 ± 1	16 ± 2	1	80	2, "			●
VE-1	5½ ± 1½	17 ± 2	1	145	....	●		
VE-2	3½ ± 1½	17 ± 2	1	100	....	●		
VRE-1	6 ± 1	19 ± 2	1⅓ to 2½	130	....		●	
VRE-2	4 ± 1	16 ± 2	1 to 2	80	....		●	
VRE-3	3 ± 1	13 ± 1	¾ to 1½	50	....		●	
SA	4½ ± 1½	12	3	65	....		●	
SB, SB-2†	4½ ± 1½	12 ± 1	2	65	....		●	
SC	4½ ± 1½	11 ± 1	1	60	....		●	
SD	4½ ± 1½	12 ± ¼	3	65	....		●	

† Altho dimensions are the same for SB and SB-2, specifications differ. Specifications, for these types are on page 17.
‡ Minimum lengths do not apply to radial curb and closures.

TABLE: STANDARDIZED CHELMSFORD WHITE GRANITE CURB

price list, page 22

This summary of STANDARDIZED CHELMSFORD WHITE GRANITE CURB sizes (with indication of curb top treatment) has been compiled to facilitate comparison of curb types listed on previous pages. Character of stone finish for the several curb faces affected in fabrication, tolerances for arrises and the different faces, description of conditions required, permitted, or not permitted—these are not readily tabulated. Refer to SPECIFICATIONS, page 9, for these details.

STANDARDIZED HIGHWAY PRODUCTS

Air view of a portion of the H. E. Fletcher Company quarry at West Chelmsford. At right, new developments to the north. Railway track extension shown under construction to service new works is now completed and in operation. Steel derrick in foreground, 165 feet high, is of 200 ton capacity. Movable cranes weighing 90 tons with 65 ton capacity, recently acquired, replace medium capacity old style derricks of fixed location.

Upper left, power house and just beyond (light tone) is shown one of our storage yards for fabricoted granite curb awaiting shipment by truck and rail.

specifications

Granite specifications on the following pages are, in content, substantially the same as in previous editions of this catalog. Included are specifications for all of the standardized granite products listed in the previous pages.

Completely reset in type of high legibility, paragraphing has been introduced to facilitate cross referencing and much of the language has been precised in effort to achieve greater clearness and brevity. These specifications, the result of careful study over a long period, aim to produce fabricated granite of high quality at costs which reflect extensive production economies through technological progress in quarrying techniques and improved fabrication methods.

VERTICAL GRANITE CURB

	VA-1 thru VA-4
	VB-0, VB-1 thru VB-4
types	VC, VD
	VE-1, VE-2
	VRE-1, VRE-2, VRE-3

a

DESCRIPTION

Scope

a.1.1 This item of work shall consist of furnishing and setting granite curbstones on an approved foundation or base and to the required line and grade, as indicated on the plans and as directed by the Engineer, in accordance with these specifications. [*See foundation specifications page 19.*]

MATERIALS

General

a.2.1 Curbstone shall be of hard and durable granite, of a light color satisfactory to the Engineer, free from seams which impair its structural integrity, and of a good, smooth splitting appearance. Granite shall come from approved quarries and, when tested, shall have a French coefficient of wear not less than 16 or a Los Angeles percentage of wear not more than 32. Test samples shall be hand broken.

Dimensions

a.3.1 The stones for the several types of curb shall be cut to the dimensions given in the following table:

TYPE	WIDTH AT TOP (inches)	DEPTH IN (inches)	†MINIMUM LENGTH (feet)	MINIMUM WIDTH AT BOTTOM (inches)
VA-1	7	17 to 19	6	5 (for ⅔ length)
VA-2	7	19 to 21	6	5 (for ⅔ length)
VA-3	6	19 to 21	6	5 (for ⅔ length)
VA-4	6	17 to 19	6	5 (for ⅔ length)
VB-0	5	17 to 19	3	4 (for ⅔ length)
VB-1	5	15 to 17	3	4 (for ⅔ length)
VB-2	4	17 to 19	3	4 (for ⅔ length)
VB-3	4	15 to 17	3	4 (for ⅔ length)
VB-4	3	15 to 19	3	3 (for ½ length)
VC	4½ to 5½	14 to 18	3	3 (for ½ length)
VD	3 to 5	14 to 18	1	2 (for ½ length)
VE-1	4 to 7	15 to 19	1	.....
VE-2	2 to 5	15 to 19	1	.....
VRE-1	5 to 7	17 to 21	1⅓ to 2½	.....
VRE-2	3 to 5	14 to 18	1 to 2	.....
VRE-3	2 to 4	12 to 14	¾ to 1½	.....

† Minimum lengths do not apply to radial curb and closures.

[*Select dimensions from above table for type or types of curb.*]

a.3.2 Type VA curbstones to be set on a radius of one-hundred sixty (160) feet or less shall be cut to the curve required, unless otherwise directed by the Engineer.

a.3.3 Type VB or VC curbstones to be set on a radius of one-hundred (100) feet or less shall be cut to the curve required, unless otherwise directed by the Engineer.

[*Select applicable paragraph.*]

[*Indicate on drawings or, in absence of drawings, establish definitely, for each run of circular curb, whether the face is on the inside or outside.*]

Finish

a.4.1 Finish and surface dimensions for the several types of curb shall conform to the following requirements:

type VA curb

a.4.2 Top surface of curbstones shall be sawed to an approximately true plane.

a.4.3 Exposed arris lines shall be pitched straight and true with no variation from a straight line greater than one-eighth (⅛) of an inch.

a.4.4 Back surfaces of curbstones, shall have no projection, for a distance of three (3) inches down from the top, which would exceed a batter of four (4) inches in twelve (12) inches.

a.4.5 Front face shall be at right angles to the plane of the top and shall be smooth quarry-split. Drill holes in exposed part of face will not be permitted.

a.4.6 Front face shall have no projections greater than three-quarters (¾) of an inch or depressions greater than one-half (½) inch measured from the vertical plane of the face through the top arris line for a distance down from the top of .... inches. [*Eight (8) inches for types VA-1 or VA-4; ten (10) inches for types VA-2 or VA-3.*] Remaining distance shall have no projections or depressions greater than one (1) inch measured in the same manner.

a.4.7 Ends of all stones shall be square with the planes of the top and face, and so finished that when stones are placed end to end as closely as possible no space more than one-half (½) inch shall show in the joint for the full width of the top or down on the face for .... inches. [*Eight (8) inches for type VA-1 or VA-4; ten (10) inches for type VA-2 or VA-3.*] Remainder of end may break back not over eight (8) inches from the plane of the joint.

type VB curb

a.4.8 Top surfaces of curbstones shall be sawed to an approximately true plane.

a.4.9 Exposed arris lines shall be pitched straight and

true with no variation from a straight line greater than one-eighth (⅛) of an inch.

a.4.10 Back surface of curbstones, shall have no projection, for a distance of three (3) inches down from the top, which would exceed a batter of four (4) inches in twelve (12) inches.

a.4.11 Front face shall be at right angles to the plane of the top and shall be smooth quarry split. Drill holes in exposed part of face will not be permitted.

a.4.12 Front face shall have no projections greater than three-quarters (¾) of an inch or depressions greater than one-half (½) inch measured from the vertical plane of the face through the top arris line for a distance of eight (8) inches down from the top. Remaining distance shall have no projections or depressions greater than one (1) inch measured in the same manner.

a.4.13 Ends of all stones shall be square with the planes of the top and face, and so finished that when stones are placed end to end as closely as possible no space more than one-half (½) inch shall show in the joint for the full width of the top or down on the face for eight (8) inches. Remainder of end may break back not over twelve (12) inches from the plane of the joint.

type VC curb

a.4.14 Top surfaces of curbstones shall be scabble dressed to an approximately true plane with no projections or depressions greater than one-half (½) inch. Drill holes will be permitted in the top surface, two (2) inches back from the front face.

a.4.15 Arris line at intersection of top surface and front face shall be pitched so that when a straightedge is applied to the full length of the curbstone, there shall be no depressions under the straightedge greater than one-half (½) inch.

a.4.16 Arris lines at ends shall be pitched with no variation from the plane of the face greater than one-eighth (⅛) of an inch.

a.4.17 Front face shall be at right angles to the plane of the top and shall be smooth quarry split, with no projections greater than three-quarters (¾) of an inch or depressions greater than one-half (½) inch measured from the vertical plane of the face thru the top arris line for a distance of eight (8) inches down from the top. Drill holes, not more than one-half (½) inch deep or more than three and one-half (3½) inches long, will be permitted in exposed part of face.

a.4.18 Ends of stones shall be square with planes of top and face, and so finished that when stones are placed end to end as closely as possible, no space more than five-eighths (⅝) of an inch shall show in the joint for the full width of the top or down on the face for eight (8) inches, after which ends may break back not more than eight (8) inches.

type VD curb

a.4.19 Top surface of curbstones shall be scabble dressed to an approximately true plane with no projections or depressions greater than one-quarter (¼) of an inch. Drill holes will be permitted in the top surface, two inches back from the front face.

a.4.20 Arris lines at the intersection of the top and face shall be pitched so that when a straightedge is applied to the full length of the stone, there shall be no depression under the straightedge greater than one-half (½) inch.

a.4.21 Arris lines at the ends shall be pitched with no variation from the plane of the face greater than one-eighth (⅛) of an inch.

a.4.22 Front face shall be at right angles to the plane of the top and shall be smooth quarry split, and with no projections or depressions greater than one-half (½) inch measured from the vertical plane of the face through the top arris line for a distance of eight (8) inches down from the top. Drill holes, not more than one-half (½) inch deep or more than three and one-half (3½) inches long, will be permitted in exposed part of face.

a.4.23 Ends of all stones shall be square with the planes of the top and face, and so finished that when the stones are placed end to end as closely as possible no space more than five-eighths (⅝) of an inch shall show in the joint for the full width of the top or down on the face for six (6) inches after which the end may break back not more than one-quarter (¼) the length of the stone.

type VE curb

a.4.24 Top surfaces of curbstones shall be sawed to an approximately true plane.

a.4.25 Arris line, top front, shall be pitched straight and true with no variation from a straight line greater than one-eighth (⅛) of an inch.

a.4.26 Front face shall be at right angles to the plane of the top and shall be smooth quarry split. There shall be no projections greater than one (1) inch or depressions greater than one-half (½) inch measured from a vertical plane of the face through the top arris line for a distance of eight (8) inches down from the top. Drill holes, not more than one-half (½) inch deep or more than three and one-half (3½) inches long, will be permitted in exposed part of face.

a.4.27 Ends shall be approximately square to the tops and so finished that when the stones are placed end to end

as closely as possible, no space more than one and one-half (1½) inches shall show in the joint for the full width of the top or down the face for eight (8) inches.

type VRE curb

a.4.28 Vertical Rubble stones for use as curbing shall be made from a smooth splitting granite.

a.4.29 Top surface of stones shall be split to an approximately true plane. Drill holes, not more than one-half (½) inch deep or more than four (4) inches long, will be permitted in the top.

a.4.30 Arris lines shall be as formed by the natural split of the stone.

a.4.31 Front face shall be at right angles to the plane of the top and shall be smooth quarry split. Drill holes not more than one-half (½) inch deep or more than four (4) inches long will be permitted in the exposed vertical face.

a.4.32 Ends shall be split approximately square to the tops.

a.4.33 When stones are placed end to end as closely as possible, no space shall show in the joint, greater than one (1) inch for a distance of four (4) inches down the face and no space shall show in the top joint greater than two (2) inches.

Mortar

a.5.1 Mortar for pointing joints shall be composed of equal parts of cement and sand with sufficient water to form a workable mixture. The materials shall conform to the requirements of A.S.T.M., C-91 and C-144.

Setting curbstones

a.6.1 Curb shall be set at line and grade required, and it shall project seven (7) inches above the shoulder grade or pavement, unless otherwise directed or called for on the plans.

a.6.2 Curbstones for Types VA and VB curb shall not fit closer to each other than one-eighth (⅛) of an inch, otherwise, they shall be fitted together as closely as possible.

a.6.3 Curbstones for Types VC and VD shall be laid so as not to fit closer to each other at any point than one-quarter (¼) of an inch, and they shall not be farther apart than one (1) inch.

[*Select applicable paragraph (a.6.2 or a.6.3).*]

Protection

a.7.1 The contractor shall protect curbstones and keep them in first class condition until completion of the entire contract. Particular care must be exercised to prevent discoloration of exposed surfaces.

Pointing

a.8.1 Joints between curbstones shall be carefully filled with cement mortar and shall be neatly pointed on top and exposed front portions. After pointing, curbstones shall be satisfactorily cleaned of all excess mortar that may have been forced out of the joints.

[*If pointing is not required, omit paragraph above, a.8.1.*]

Filling about trench

a.9.1 After curb is set, space between it and wall of the trench shall be filled with approved material thoroughly tamped, to depth directed, care being taken not to affect the line or grade of curb.

COMPENSATION

Method of measurement

a.10.1 The quantity of granite curb to be paid for will be the length actually laid in accordance with the plans and as directed by the Engineer, as measured along the front arris line of the curb.

Basis of payment

a.11.1 Granite curb will be paid for at the contract unit price per lineal foot under the item for the particular type and kind of curb required, furnished and installed, complete in place, which price shall include full compensation for all materials used, except foundation, and for all excavations, except rock.

a.11.2 Curved curb shall include all curb, except curb corners, cut and set to curves as directed.

Payment items

a.12.1 Granite Curb Type....Straight....Lin. Ft.
Granite Curb Type....Curved ....Lin. Ft.

[*Insert proper item numbers and enumerate particular types of curb.*]

Note on Bridge Curb

RIGOROUS CONDITIONS. Long experience has shown that all kinds or types of curb receive their supreme test of endurance on bridges where conditions conducive to disintegration act vigorously and incessantly. Rigorous conditions on bridges cause serious deterioration and eventual destruction of most curbing.

There are, no doubt, many reasons for this accelerated wear; among them the following may be included.

§*Exposure: top and bottom of road bed are both exposed. Bridges are by nature usually in open exposed and wind-swept locations.*

§*Vibration: a bridge is a flexible structure.*

§*Expansion and contraction: successive thermal cycles cause distortion and constant movement of the structure.*

§*Thaw chemicals: these are usually applied in larger quantities and more frequent intervals on bridges to speed up snow and ice removal. Such chemicals have marked deleterious effect upon most curb materials.*

Granite curb survives under these conditions with no apparent effect on its structural integrity, soundness, or appearance.

STANDARDIZATION. *The term "standardization" as applied to bridge type granite curb refers to standardization of tolerances and finishes of fabrication; tolerances and methods of setting; and details of installation within the general scheme of bridge construction. In these details of external design, progress has been made toward some pattern of uniformity.*

However, granite bridge curb sizes have been slow to fall within any noticeable pattern of uniformity. Consequently most vertical granite bridge curb, as far as size and shape is concerned, is still designed to meet requirements of the engineer and special conditions of each bridge.

[*See page 18 for* SLOPE GRANITE CURB *for bridges.*]

VERTICAL GRANITE CURB

b

for bridges type VA-5

DESCRIPTION

Scope

b.1.1 This item of work shall consist of furnishing and setting granite curbstones on bridge decks and to the required line and grade, as indicated on the plans and as directed by the Engineer, in accordance with these specifications.

MATERIALS

General

b.2.1 Curbstone shall be of hard and durable granite, of a light color satisfactory to the Engineer, free from seams which impair its structural integrity, and of a good, smooth splitting appearance. Granite shall come from approved quarries and, when tested, shall have a French coefficient of wear not less than 16 or a Los Angeles percentage of wear not more than 32. Test samples shall be hand broken.

Dimensions

b.3.1 Stones for this type of curb shall be cut to the dimensions given in the following table:

TYPE	WIDTH AT TOP (inches)	DEPTH (inches)	MINIMUM LENGTH (feet)	MINIMUM WIDTH AT BOTTOM (inches)
VA-5	6	11¾ to 12¼	4	5 (for ⅔ length)

[*Curbstones to be set on a radius of one-hundred sixty (160) feet or less should be ordered cut to the curve required.*]

[*Size shown in above table for this type of curb is typical: other sizes will be cut to order on request.*]

Finish

b.4.1 Finish and surface dimensions for this type of curb shall conform to the following requirements.

b.4.2 Top surface of curbstones shall be sawed to an approximately true plane.

b.4.3 Exposed arris lines shall be pitched straight and true with no variation from a straight line greater than one-eighth (⅛) of an inch.

b.4.4 Back surface of curbstones shall have no projections or depressions greater than one and one-half (1½) inches.

b.4.5 Front face shall be at right angles to the plane of the top and shall be smooth quarry split. Drill holes in exposed part of face will not be permitted.

b.4.6 Front face shall have no projections or depressions greater than one-half (½) inch for the full depth of the stone.

b.4.7 Ends shall be finished at the face for the full depth of the stone. Remainder of the ends may break back not over two (2) inches from the plane of the joint.

b.4.8 Bottoms of curbstones shall be parallel to the top and sawed or dressed to lay with not more than five-eighths (⅝) of an inch joint at the face for the full length of the stone. Remainder of bottoms may fall away not over one (1) inch.

b.4.9 Two anchors shall be grouted into the back of each curbstone. Anchor holes shall be pitched downward at approximately forty-five (45) degrees and shall be located approximately four (4) inches below the top and twelve (12) inches from each end.

Anchors

b.5.1 Anchors, one-half (½) inch in diameter, shall have a three (3) inch square hook on one end and a three (3) inch forty-five (45) degree bend on the other end, both

pointing downward. They shall be galvanized after fabrication. Anchors shall extend at least six (6) inches into the concrete behind the curbstones.

Mortar

b.6.1 Mortar for joints shall be composed of equal parts of cement and sand with sufficient water to form a workable mixture. The materials shall conform to the requirements of A.S.T.M., C-91 and C-144.

Setting curbstones

b.7.1 After concrete base has set, and before concrete in back of curb is placed, curbstones shall be set to line and grade in full mortar beds and full mortar end joints. Anchors shall be grouted into curbstones as they are being set. Joints shall be finished smooth and flush and shall be satisfactorily cleaned of all excess mortar.

Pointing

b.8.1 Joints between curbstones shall be carefully filled with cement mortar and shall be neatly pointed on top and exposed front portions. After pointing, curbstones shall be satisfactorily cleaned of all excess mortar that may have been forced out of the joints.

Placing concrete behind curb

b.9.1 When placing concrete behind curbstones avoid disturbing line or grade of curb.

Protection

b.10.1 The contractor shall protect curbstones and keep them in first class condition until completion of the entire contract. Particular care must be exercised to prevent discoloration of exposed surfaces.

COMPENSATION

Method of measurement

b.11.1 The quantity of granite curb to be paid for will be the length actually laid in accordance with the plans and as directed by the Engineer, as measured along the front arris line of the curb.

Basis of payment

b.12.1 Granite curb will be paid for at the contract unit price per lineal foot under the item for the particular type and kind of curb required, furnished and installed, complete in place, which price shall include full compensation for all materials used.

Payment items

b.13.1 Granite Curb Type VA-5....Straight....Lin. Ft.
Granite Curb Type VA-5....Curved....Lin. Ft.

[*Insert proper item numbers and enumerate particular types of curb.*]

GRANITE CURB INLETS C

DESCRIPTION

Scope

c.1.1 This item of work shall consist of furnishing and setting granite curb inlets at catch basins to the required line and grade, as indicated on the plans and as directed by the Engineer, in accordance with these specifications.

MATERIALS

General

c.2.1 Granite for the curb inlets shall meet the requirements of paragraph a.2.1.

Dimensions

c.3.1 Curb inlets shall be not less than five (5) feet and eleven (11) inches or more than six (6) feet and one (1) inch in length, from seventeen (17) to nineteen (19) inches in depth, matching the adjoining curbstones in width at the top and at least seven (7) inches wide at the bottom.

Finish

c.4.1 Finish and surface dimensions for curb inlets shall conform to the requirements of adjoining..... [*VA or VB curb, specify which*] except that limitations on face projections or depressions shall extend to ten (10) inches down from the top.

[*Compare with VA specification a.4.6 and VB specification a.4.12.*]

c.4.2 A gutter mouth starting four (4) inches below the top and twenty-four (24) inches in length shall be cut in the center of the front face of the stone. Upper corners at the face shall have a radius of four (4) inches. Mouth opening shall penetrate behind the plane of inlet face, three (3) inches at the top increasing to four (4) inches at the bottom. Internal corners shall be well rounded.

Mortar

c.5.1 Mortar shall conform to the requirements of paragraph a.5.1.

CONSTRUCTION METHODS

Foundation

c.6.1 Foundation for the curb inlet shall consist of a full bed of Portland cement mortar on the back wall of the catch basin and an approved foundation on each side to support the overhang.

Setting of curb inlets

c.7.1 Curb inlets shall be set at the required line and

grade on the foundation as above specified (c.6.1) and carefully supported until the cement mortar has set.

Pointing

c.8.1 Joints between curbstones and curb inlet stones shall be carefully filled with cement mortar and shall be neatly pointed on top and exposed front portions. After pointing, curbstones and adjoining inlet stones shall be satisfactorily cleaned of all excess mortar that may have been forced out of the joints.

[*If pointing is not required omit paragraph above, c.8.1.*]

Protection

c.9.1 The Contractor shall protect curb inlets and keep them in first class condition until the completion of the entire contract. Particular care will be required to prevent any discoloration of the exposed surfaces.

Defective work

c.10.1 Curb inlets damaged at any time previous to final acceptance of the work shall be removed and replaced with satisfactory curb inlets at the Contractor's expense.

COMPENSATION

Method of measurement

c.11.1 Each curb inlet, complete in place, will be considered as one unit.

Basis of payment

c.12.1 Granite curb inlets will be paid for at the contract unit price for each granite curb inlet, furnished and installed, complete in place, which price shall include full compensation for all materials used, except foundation, and for all excavation, except rock, in excess of that required for each catch basin.

Payment items

c.13.1 Granite Curb Inlets....Straight....Each.
Granite Curb Inlets....Curved ....Each.

GRANITE CURB CORNERS d

style A	2′-0″ radius
style B	3′-0″ radius

DESCRIPTION

Scope

d.1.1 This work shall consist of furnishing and setting granite curb corners on an approved foundation or base at the location and to the required line and grade, complete in place, as shown on the plans or as directed.

MATERIALS

General

d.2.1 Granite for the curb corners shall be in accordance with paragraph a.2.1.

Dimensions

d.3.1 Curb corners for the several types of curb shall be cut to the dimensions given in the following table:

TYPE	WIDTH OF TOP AT JOINT (inches)	DEPTH (inches)	MINIMUM WIDTH AT BOTTOM OF JOINT (inches)
VA-1	7	17 to 19	5
VA-4	6	17 to 19	5
VB-1	5	15 to 17	4
VB-2	4	17 to 19	4
VB-3	4	15 to 17	4

[*Select applicable type or types of curb corners.*]

[*Curb corners can be supplied on order to match with stone depth and joint width of other VA and VB granite curb types. See also comments occurring under,* STANDARDIZED VERTICAL CURB CORNERS, *page 5.*]

Finish

d.4.1 Curb corners shall match the adjacent curbstones in size, color and quality.

d.4.2 Top surface shall be peen hammered or sawed to an approximately true plane. There shall be no projections or depressions greater than one-eighth (⅛) of an inch.

d.4.3 Arris line, top front, shall be pitched to correct radius.

d.4.4 Arris line, top back, shall be pitched straight and true with no variation from a straight line greater than one-eighth (⅛) of an inch.

d.4.5 Arris lines at ends shall be pitched with no variation from plane of face greater than one-eighth (⅛) of an inch.

d.4.6 Back surface shall have no projection for three (3) inches down from the top which would exceed a batter of four (4) inches in twelve (12) inches.

d.4.7 Front face shall be at right angles to the plane of the top and shall be sawed or quarry split, and with no projection greater than one (1) inch and no depression greater than one-half (½) inch measured from the vertical plane of the face through the top arris line for a distance of eight (8) inches down from the top. Remaining distance shall have no projections or depressions greater than two

(2) inches measured in the same manner. Drill holes in exposed part of face will not be permitted.

d.4.8 Ends of curb corner stones shall be square with the planes of the top and face and so finished that when corner stones are placed end to end with adjoining straight curbstones as closely as possible no space more than one-half (½) inch shall show in the joint for the full width of the top or down on the face for eight (8) inches. Remainder of end may break back not over five (5) inches.

d.4.9 Bottoms shall be reasonably level and sufficiently full to provide a firm, even bearing.

d.4.10 Curb corners, if sawed, shall be thoroughly cleaned of any iron rust or iron particles.

Setting curb corners

d.5.1 Curb corners shall be carefully set in such a manner that a firm, even bearing will result and the stone will be true to line and grade as shown on plans and as directed.

Pointing

d.6.1 Joints between curbstones and curb corner stones shall be carefully filled with cement mortar and shall be neatly pointed on top and exposed front portions. After pointing, curbstones and adjoining corner stones shall be satisfactorily cleaned of all excess mortar that may have been forced out of the joints.

[*If pointing is not required omit paragraph above, d.6.1.*]

Protection

d.7.1 The Contractor shall protect curb corners and keep them in first class condition until the completion of the entire contract. Particular care shall be exercised to prevent discoloration of exposed surfaces.

Defective work

d.8.1 Curb corners, damaged at any time previous to final acceptance of the work, shall be removed and replaced with satisfactory curb corners at the Contractor's expense.

COMPENSATION

Method of measurement

d.9.1 Each curb corner set, complete in place, will be considered as one unit.

Basis of payment

d.10.1 Granite curb corners will be paid for at the contract unit price for each granite curb corner, furnished and installed, complete in place, which price shall include full compensation for all materials used, except foundations, and for all excavation, except rock.

Payment items

d.11.1 Granite Curb Corners Style .....Each.

[*Indicate whether Style A or B is required.*]

SLOPE GRANITE CURB

e

types	SA
	SB, SB-2
	SC

DESCRIPTION

Scope

e.1.1 This item of work shall consist of furnishing and setting slope granite curb on an approved foundation on a one to one (1:1) slope and to the required line and grade, as indicated on the plans and as directed by the Engineer, in accordance with these specifications.

[*See page 19 regarding foundations.*]

[*If other slope than 1:1, is required, so indicate in e.1.1.*]

MATERIALS

General

e.2.1 Curbstone shall be of hard and durable granite, of a light color satisfactory to the Engineer, free from seams which impair its structural integrity, and of a good, smooth splitting appearance. Granite shall come from approved quarries and, when tested, shall have a French coefficient of wear not less than 16, or a Los Angeles percentage of wear not more than 32. Test samples shall be hand broken.

Dimensions

e.3.1 The stones for the several types of slope curb shall be cut to the dimensions given in the following table:

TYPE	DEPTH OF FACE (inches)	THICKNESS (inches)	LENGTH† (feet)
SA	12	3 to 6	3 to 6
SB	11 to 13	3 to 6	2 to 6
SB-2	11 to 13	3 to 6	2 to 6
SC	10 to 12	3 to 6	1 to 4

† Minimum lengths do not apply to radial slope curb.

[*Select dimensions for particular type or types of slope curb from above table.*]

e.3.2 Maximum lengths of stones shall be as directed by the Engineer, when the curb is used on curves of one hundred (100) foot radius or less.

Finish

e.4.1 Finish and surface dimensions for the several types of stone curb shall conform to the following requirements:

type SA curb

e.4.2 Exposed face shall be smooth quarry split to an approximately true plane having no projections or depressions which will cause over one (1) inch to show between a two (2) foot straightedge and the face when the

straightedge is placed as closely as possible on any part of the face. If projections on the face are more than that specified they shall be dressed off. Drill holes will be permitted on the exposed face, but only along the bottom edge.

e.4.3 Arris line, top front, shall be pitched to a line which shall not show over one-half (½) inch in any direction between the stone and a straightedge laid the full length of the stone.

e.4.4 Arris line, bottom front, shall be pitched so that not over one-half (½) inch shall show between the stone and a straightedge, the full length of the stone, when viewed at right angles to the plane of the face.

e.4.5 Arris lines at ends shall be pitched with no variation from the plane of the face more than one-quarter (¼) of an inch.

e.4.6 Ends shall be square to the plane of the face and so finished that when stones are placed end to end as closely as possible no space more than three-quarters (¾) of an inch shall show in the joint for the full depth of the face.

e.4.7 Tops and bottoms shall not be under the square more than four (4) inches or over the square at the back more than one (1) inch.

type SB curb

e.4.8 Exposed face shall be smooth quarry split to an approximately true plane having no projections or depressions which will cause over one (1) inch to show between a two (2) foot straightedge and the face when the straightedge is placed as closely as possible on any part of the face. If projections on the face are more than that specified they shall be dressed off. Drill holes not more than three and one-half (3½) inches in length or one-half (½) inch in depth will be permitted.

e.4.9 Arris line, top front, shall be pitched to a line which shall not show over one (1) inch in any direction between the stone and a straightedge the full length of the stone.

e.4.10 Arris line, bottom front, shall be pitched so that not over one (1) inch shall show between the stone and a straightedge, the full length of the stone, when viewed at right angles to the plane of the face.

e.4.11 Arris lines at ends shall be pitched with no variation from the plane of the face more than one-quarter (¼) of an inch.

e.4.12 Ends shall be square to the plane of the face and so finished that when stones are placed end to end as closely as possible no space more than one and one-half (1½) inches shall show in the joint for the full width of the face.

e.4.13 Tops and bottoms shall not be under the square more than four (4) inches or over the square at the back more than one (1) inch.

type SB-2 curb

[*Specification for type SB-2 curb is the same as the specification for type SB curb (e.4.8 through e.4.13) except paragraph e.4.9. In lieu of paragraph e.4.9 substitute the following.*]

e.4.14 Arris line, top front, shall be pitched straight and true with no variation from a straight line greater than one-eighth (⅛) of an inch.

[*All other paragraphs under type SB curb remain the same.*]

type SC curb

e.4.15 Exposed face shall be smooth quarry split to an approximately true plane having no projections or depressions which will cause over one-half (½) inch to show between a two (2) foot straightedge and the face when the straightedge is placed as closely as possible on any part of the face. If projections on the face are more than that specified they shall be dressed off. Drill holes not more than three and one-half (3½) inches in length or one-half (½) inch in depth will be permitted.

e.4.16 Arris line, top front, shall be pitched to a line which shall not show over one (1) inch in any direction between the stone and a straightedge the full length of the stone.

e.4.17 Arris line, bottom front, shall be pitched so that not over one (1) inch shall show between the stone and a straightedge, the full length of the stone, when viewed at right angles to the plane of the face.

e.4.18 Arris lines at ends shall be pitched with no variation from the plane of the face more than one-quarter (¼) of an inch.

e.4.19 Ends shall be square to the plane of the face and so finished that when the stones are placed end to end as closely as possible no space more than one and one-half (1½) inches shall show in the joint for the full width of the face.

e.4.20 Tops and bottoms shall not be under the square more than four (4) inches or over the square at the back more than one (1) inch.

Mortar

e.5.1 Mortar for pointing joints shall be composed of equal parts of cement and sand with sufficient water to form a workable mixture. Materials shall conform to the requirements of A.S.T.M., C-91 and C-144.

Setting method

e.6.1 Slope granite curb shall be set at line and grade re-

quired. Top line of curb shall be set straight and true allowing natural variations in depth of curb to occur at the bottom of the face. Spaces under the stones shall be filled with approved material and so tamped that the slope granite curb will bear and be completely supported throughout its entire length and width at the required line, grade and slope. Curbstones shall not fit closer to each other than one-quarter (¼) of an inch, otherwise, they shall be fitted together as closely as possible.

Pointing joints

e.7.1 Joints between curbstones shall be carefully filled with mortar for a depth of three (3) inches in from the face. They shall be neatly pointed on the face. Curbstone faces shall be satisfactorily cleaned of all excess mortar.

Protection

e.8.1 The contractor shall protect slope granite curb and keep stones in first class condition until completion of the entire contract. Particular care shall be exercised to prevent any discoloration of exposed surfaces.

COMPENSATION

Method of measurement

e.9.1 The quantity of slope granite curb to be paid for will be the length actually laid and completed in accordance with the plans and as directed by the Engineer, as measured along the front arris line of the curb.

Basis of payment

e.10.1 Slope granite curb will be paid for at the contract unit price per lineal foot under the item for the particular type and kind of edging required, furnished and installed, complete in place, which price shall include full compensation for all materials used, except foundations, and for all excavations, except rock.

Payment items

e.11.1 Slope Granite Curb Type,.....Lin. Ft.

[*Insert proper item designation* (SA, SB, SB-2, or SC) *and indicate number of lineal feet required.*]

* * * * * *

Note

SLOPE CURB, Bridge Type. With general acceptance of vertical granite curb for use on bridges there has also been a growing trend to the use of a raised median or division strip. With the development of this important design feature, slope curb sections are receiving careful study and are becoming more widely used.

SLOPE GRANITE CURB

f

☛ for bridges

type | SD

DESCRIPTION

Scope

f.1.1 This item of work shall consist of furnishing and setting granite curbstones on bridge decks and to the required line and grade, as indicated on the plans and as directed by the Engineer, in accordance with these specifications.

f.1.2 Slope granite curb, bridge type, shall be set on a slope of ..... [*insert slope required; recommended slope for this type of curb, one to one (1:1).*]

MATERIALS

General

f.2.1 Curbstone shall be of hard and durable granite, of a light color satisfactory to the Engineer, free from seams which impair its structural integrity, and of a good, smooth splitting appearance. Granite shall come from approved quarries and, when tested, shall have a French coefficient of wear not less than 16, or a Los Angeles percentage of wear not more than 32. Test samples shall be hand broken.

Dimensions

f.3.1 Stones for this type of curb shall be cut to the dimensions given in the following table:

TYPE	DEPTH OF FACE	THICKNESS	LENGTH†
SD	12 inches	3 to 6 inches	3 to 6 feet

† Minimum lengths do not apply to radial curb and closures.

[*Select dimensions from above table for type or types of curb.*]

f.3.2 Maximum lengths of curbstone shall be as directed by the Engineer, when curb is used on curves of one hundred sixty (160) feet radius or less.

Finish

f.4.1 Finish and surface dimensions for this type of curb shall conform to the following requirements.

f.4.2 Exposed face shall be smooth quarry split to an approximately true plane having no projections or depressions which will cause over one (1) inch to show between a two (2) foot straight edge and the face when the straightedge is placed as closely as possible on any part of the face. If projections on the face are more than specified above they shall be dressed off. Drill holes in exposed part of curbstone face will be permitted only along bottom edge.

f.4.3 Exposed arris lines, (at top and bottom face) shall be pitched straight and true with no variation from a straight line greater than one-eighth (⅛) of an inch.

f.4.4 Arris lines at ends of face shall be pitched with no variation from plane of face more than one-quarter (¼) of an inch.

f.4.5 Ends shall be square to the plane of the face and so finished that when stones are placed end to end, as closely as possible, no space more than one (1) inch shall show on the joint for full depth of face.

f.4.6 Bottom of curbstones and lower part of back of curbstones shall be dressed off to permit forming a bed to facilitate setting on required slope. A bearing spot shall be provided near each end of each curbstone. Elsewhere on the bed there shall be no projection in excess of one-quarter (¼) inch and no depression in excess of two (2) inches.

f.4.7 Top of curbstone shall not be under the square more than four (4) inches or over the square at the back more than one-quarter (¼) inch.

Mortar

f.5.1 Mortar for pointing joints shall be composed of equal parts of cement and sand with sufficient water to form a workable mixture. The materials shall conform to the requirements of A.S.T.M., C-91 and C-144.

Setting curbstones

f.6.1 Curb shall be set at line and grade required. Spaces under curbstones shall be filled with approved material so that each curbstone will be supported throughout its entire length and width at the required line, grade and slope. Curbstones shall not fit closer to each other than one-quarter (¼) of an inch, otherwise, they shall be fitted together as closely as possible.

Placing concrete behind curb

f.7.1 When placing concrete behind curbstones avoid disturbing line, grade, or slope of curb.

Pointing joints

f.8.1 Joints between curbstones shall be carefully filled with mortar [as specified f.5.1], for a depth of three (3) inches in from the face. Joints shall be neatly pointed on the face. Faces of curb shall be satisfactorily cleaned of all excess mortar.

Protection

f.9.1 The contractor shall protect slope granite curb, bridge type, and keep stones in first class condition until completion of the entire contract. Particular care shall be exercised to prevent any discoloration of exposed surfaces.

FOUNDATIONS g

These foundation specifications can be applied when natural sub-soil conditions indicate adequate drainage and a good gravel is available for back fill. Where drainage conditions appear doubtful, screened gravel or crushed stone and in extreme cases, drain tile bedded in crushed stone, should be used under the curb foundation. Such locations should be treated separately and special foundation specifications written.

Excavating trench

g.1.1 Trench for the curb shall be excavated to a width of eighteen (18) inches. Bottom of trench shall be six (6) inches below bottom of proposed curbstone.

Preparing foundation

g.2.1 Foundation for the curb shall consist of gravel spread upon the sub-grade and, after being thoroughly compacted by tamping, shall be not less than six (6) inches in depth. Gravel for filling shall be approved by the Engineer and shall contain no stones larger than two (2) inches.

Setting curbstones

g.3.1 Additional gravel shall be provided as required. Curbstones shall be set as specified and all spaces under curbstones carefully and thoroughly rammed so that the curbstones shall be completely supported throughout their entire length.

[*Whenever possible the remaining area of the trench should be backfilled with thoroughly tamped gravel.*]

GRANITE RUBBLE BLOCK PAVEMENT h

DESCRIPTION

Scope

h.1.1 This item of work shall consist of furnishing and setting granite rubble block pavement on an approved base to required grade as indicated on the plans and as directed by the Engineer in accordance with the specifications.

MATERIALS

General

h.2.1 Rubble pavement blocks shall be cut from hard

and durable granite, of a color satisfactory to the Engineer, free from seams which impair its structural integrity, and of a good, smooth splitting appearance. Granite shall come from approved quarries and, when tested, shall have a French coefficient of wear not less than 16 or a Los Angeles percentage of wear not more than 32. Test samples shall be hand broken.

h.2.2 Rubble pavement blocks shall be unused.

Dimensions

h.3.1 Rubble pavement blocks shall be not less than four (4) inches nor more than twelve (12) inches in length, not less than three (3) inches nor more than five (5) inches in width, and not less than three (3) inches nor more than five (5) inches in depth. Rubble blocks shall be fairly rectangular in shape.

Cutting

h.4.1 Opposite faces of rubble blocks shall be approximately parallel; adjoining faces shall be approximately at right angles to each other. Blocks shall be dressed so that they may be laid with one (1) inch to one and one-half (1½) inch joints.

Mortar

h.5.1 Mortar for joints shall be composed of one part Portland cement, one part natural cement, and four parts of fine aggregates.

METHOD

Laying

h.6.1 Blocks shall be carefully laid on a sand cushion over a properly prepared base, as shown on the Plans and directed by the Engineer, and shall be solidly rammed in position.

h.6.2 Joints between blocks shall be a maximum of one and one-half (1½) inches and a minimum of one (1) inch in width.

h.6.3 After a sufficient area of block pavement has been laid, surface shall be tested with a ten (10) foot straight edge laid parallel with the center line and any variation exceeding one-quarter (¼) inch shall be corrected and brought to the proper grade.

h.6.4 Blocks must be kept perfectly clean and joints between stones shall be kept clean and open to the full depth of blocks until joint filler has been applied.

h.6.5 Stones disturbed in making replacements or correcting variations shall be settled into place by carefully ramming or tamping to grade by the use of a hand tamper applied upon a two (2) inch board.

Approvals

h.7.1 Each section of block surfacing must be acceptable to the Engineer before joints in that section are filled with mortar.

Filling Joints

h.8.1 Joints shall be filled with mortar as specified (h.5.1). Mortar shall be placed and worked to the full depth of each joint.

Cleaning

h.9.1 Top surface of blocks must be kept clean of mortar stains. Immediately after the mortar joints have set sufficiently, granite block pavement shall be swept clean and any marks on the top surface removed.

COMPENSATION

Method of measurement

h.10.1 The measure of quantity for payment will be the number of square yards of pavement placed.

Basis of payment

h.11.1 Granite rubble block pavement will be paid for at the contract unit price per square yard.

Work included

h.12.1 Contract price shall cover the furnishing and placing of sand cushion, granite blocks, joint filler, and all other materials, labor and equipment necessary to install and complete the work.

Work not included

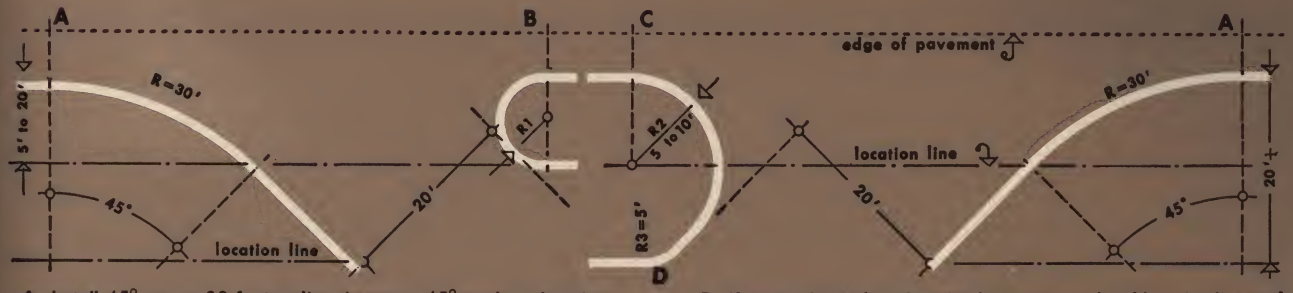
h.13.2 Preparation and bringing to grade of base, over which sand cushion is placed, will not be paid for under this item.

[*End of specifications*]

Fletcher Quarry, West Chelmsford. View looking into bottom of quarry. Following an initial coring operation of limited extent (remains shown at extreme right), wiresaw equipment in deep narrow parallel channels frees granite blocks from the natural beds with no waste.

DIAGRAMS:
HIGH-SPEED HIGHWAY, ENTRANCES AND EXITS, GRANITE CURB

COMMERCIAL DRIVEWAY CURB 1



A. Install 45° arc on 30 foot radius, thence at 45° angle to location line.

B. When distance from curb line to location line is 20 feet or less, use half the distance between curb line and the location line, for length of radius (R_1).

C. When distance from curb line to location line is more than 20 feet or when grass plot extends beyond location line use minimum radius of 5 feet or maximum radius of 10 feet (R_2).

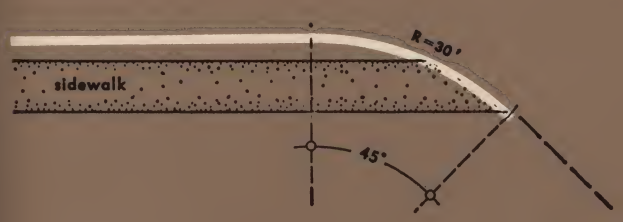
D. If grass plot ends at location line, ease angle of location line and driveway with 5 foot radius (R_3).

☞ Items A, B, C, D correspond in text and in diagram.

Effective width of driveway is shown as 20 feet. When major use of driveway is by trucks, increase effective width to 24 feet. Under city conditions or limited frontage exceptions may be necessary.

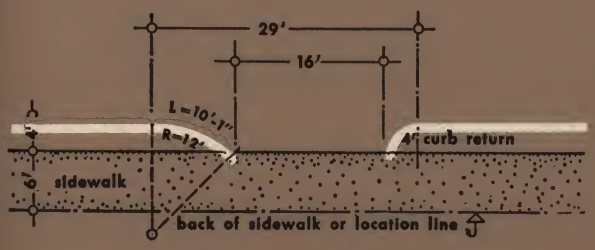
Whenever possible use standard 10 foot radius with tangent fillers for conditions at B or C.

COMMERCIAL DRIVEWAY CURB 2



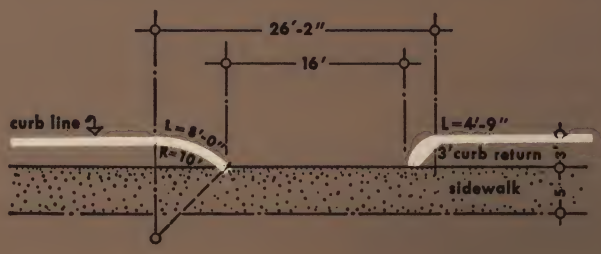
For driveway returns, extend from highway curb line on the 30 foot radius and the 5 foot to 10 foot radius to point of tangency of 45° or to the edge of sidewalk.

RESIDENTIAL DRIVEWAY CURB 3



3A. SIDEWALK LAYOUT

Longer radius approaches to right angle driveways tend to encourage traffic to keep to the right when turning off.



3B. SIDEWALK LAYOUT

Additional copies of these DIAGRAMS are available.

STANDARDIZED HIGHWAY PRODUCTS

		TRUCKLOAD DELIVERED PRICES			CARLOAD DELIVERED PRICES				
		In New England							
		50 Miles	75 Miles	125 Miles	Syracuse, N. Y.	Trenton, N. J.	Dover, Del.	Wilkes-Barre, Pa.	Baltimore, Md.
VA-1	per lineal foot	$2.59	$2.60	$2.75	$2.91	$2.89	$2.97	$2.95	$2.98
VA-2	" " "	2.82	2.87	2.99	3.24	3.22	3.29	3.26	3.32
VA-3	" " "	2.64	2.67	2.80	3.05	3.03	3.09	3.08	3.12
VA-4	" " "	2.39	2.43	2.55	2.71	2.70	2.75	2.72	2.76
VA-5	" " "	3.02	3.06	3.16	3.20	3.20	3.22	3.21	3.24
VB-0	" " "	2.29	2.35	2.45	2.64	2.63	2.68	2.67	2.71
VB-1	" " "	2.19	2.25	2.35	2.37	2.36	2.41	2.39	2.42
VB-2	" " "	2.09	2.14	2.25	2.41	2.39	2.44	2.43	2.47
VB-3	" " "	2.06	2.11	2.22	2.22	2.20	2.25	2.24	2.26
VB-4	" " "	1.91	1.97	2.07	2.12	2.11	2.16	2.14	2.17
VC	" " "	1.75	1.81	1.86	1.99	1.98	2.02	2.01	2.03
VD	" " "	1.50	1.56	1.61	1.67	1.67	1.71	1.68	1.72
VE-1	" " "	1.56	1.62	1.71	1.89	1.88	1.94	1.91	1.95
VE-2	" " "	1.41	1.47	1.56	1.59	1.58	1.62	1.60	1.63
VRE-1	" " "	1.35	1.48	1.61	1.53	1.51	1.57	1.55	1.59
VRE-2	" " "	.80	.88	.96	.91	.90	.93	.92	.94
VRE-3	" " "	.52	.57	.62	.59	.58	.61	.60	.61
SA	" " "	1.74	1.80	1.89	1.90	1.90	1.93	1.91	1.94
SB	" " "	1.48	1.53	1.63	1.63	1.63	1.65	1.64	1.66
SB-2	" " "	1.82	1.86	1.93	1.97	1.97	1.99	1.98	2.00
SC	" " "	1.30	1.37	1.47	1.43	1.43	1.45	1.44	1.47
SD	" " "	2.34	2.39	2.46	2.45	2.45	2.47	2.46	2.47
Curb Corner Style A	each	12.23	12.49	12.83	13.65	13.48	13.70	13.63	13.78
Curb Corner Style B	"	23.98	24.51	24.98	26.50	26.36	26.78	26.65	26.93
Curb Inlets Straight	"	23.18	23.51	23.84	25.70	25.56	25.97	25.83	26.12
Curb Inlets Circular	"	33.40	33.65	33.90	35.83	35.72	36.04	35.93	36.14
Land Court Bounds	"	6.23	6.56	6.82	6.08	6.08	6.11	6.09	6.12
Split Bounds	"	4.18	4.50	4.83	4.01	4.00	4.03	4.02	4.04
Surveyor's Bounds	"	5.03	5.43	5.70	5.16	5.13	5.23	5.19	5.25
Standard Bounds	"	4.67	5.07	5.34	4.80	4.77	4.77	4.83	4.89
Highway Bounds, plain	"	11.42	11.76	12.02	11.72	11.68	11.80	11.77	11.85
Highway Bounds, lettered	"	16.69	17.01	17.28	16.99	16.93	17.07	17.04	17.11
Town Bounds	"	7.55	7.94	8.20	7.87	7.84	7.93	7.91	7.97
Rubble Pavement Blocks,	per M blocks	200.72	213.12	225.44	232.00	230.40	235.20	233.60	236.80

TABLE: APPROXIMATE LIST PRICE FOR ESTIMATING GRANITE PRODUCTS

Prices listed in the above table are based on the H. E. Fletcher Co., Standard Specifications, for straight curb in stock lengths, in truckload or carload quantities, and are subject to our sales terms.

For estimating radius curb, for radii over ten feet use 1½ times the price for straight curb; for radii from two feet to ten feet use 2 to 3 times the price for straight curb. Minimum lengths do not apply on radial curb.

The above prices are approximate and have been compiled to be of assistance in estimating. Upon request, firm quotations for particular conditions and locations will be given promptly. All prices are subject to change or withdrawal without notice.

1

2

3

4

5

6

1 Lifting a granite block from the quarry
2 Splitting blocks into curbstones
3 Shaping and trimming curbstones
4 Stock pile of granite curbstones
5 Transportation by rail
6 Transportation by truck

Catalogs now in preparation, of other Fletcher granite products, include

GRANITE IN BRIDGES
GRANITE IN LANDSCAPE DESIGN
GRANITE VENEER
COLOR IN GRANITE

Copies of these catalogs are available on request to the West Chelmsford office.

H. E. FLETCHER CO., WEST CHELMSFORD, MASSACHUSETTS

LOWELL, MASS.
GLenview 7-7588

RUBBLE MEDIAN STRIP BLOCKS. SEE PAGE 6, THIS CATALOG

NEW YORK
H. E. FLETCHER CO., INC.
114 East 40th Street, New York 16, N.Y.
OXford 7-4131

ALBANY
TIM O'MEARA SALES COMPANY
240 State Street, Albany 6, New York.
ALbany 5-1828

HARTFORD
J. P. KELLY & SON
161 Washington Street, Hartford 6, Conn.
JAckson 2-3292

ERNEST BORN *designer*